

Evaluation of thyroid function tests and thyroid autoantibodies in female patients with Hepatitis C

Thyroid function tests and thyroid autoantibodies in patients with Hepatitis C

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Abstract

Aim: The prevalence of hepatitis C virus infection in the world is estimated to be approximately 2,2-3%. In our country, the anti-HCV antibody positivity rate obtained from donor screenings in different centers was found to be 0,54% on average between 2000-2006, while in the community- based studies, the anti-HCV positivity rate was found between 0,4-2,1%. In this study, it was aimed to investigate the diagnosis of the thyroid gland in patients with HCV infection in Uşak province, disorders of thyroid function tests, and the frequency of thyroid autoantibodies.

Materials and Methods: Fifty-seven anti-HCV positive female patients who applied to Private Oztan Health Hospital between January 1, 2016 and December 31, 2018 were retrospectively evaluated and included in the study. Since there were only 4 male patients, female patients were included in the study. The laboratory results of the patients were reached from the laboratory information system. Anti-HCV antibody was studied with original reagent and calibrators on Vitros ECI/ECIQ Immunodiagnostic Systems USA. Values above 1 mIU/mL were considered positive. Free T3, free T4, TSH, anti-TG, anti-TPO, AST, and ALT results were compared statistically in both groups.

Results: There was a significant difference between ALT levels and the Student t-test, which compared the means across the two groups ($p=0,0$). With the use of the Pearson Chi-Square test, a statistically significant difference was found in Free T3, Free T4, Anti-TG, Anti-TPO, thyroid-related disease diagnosis, and diagnosis and/or thyroid test dysfunction parameters ($p<0,05$).

Discussion: Female patients with HCV infection have a high risk of diseases related to the thyroid-gland. Therefore, these patients should be examined and monitored for thyroid gland disease, thyroid tests dysfunction, and thyroid autoantibodies. We believe that it is beneficial to carry out clinical research along with treatment follow-ups and also in the group of HCV infected male patients.

Keywords

Hepatitis C; Thyroid gland; Thyroid tests

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Introduction

The prevalence of hepatitis C virus infection in the world is estimated to be approximately 2,2-3% [1]. In our country, the anti-HCV antibody positivity rate obtained from donor screenings in different centers was found to be 0,54% [2,3] on average between 2000-2006, while in the community-based studies, the anti-HCV positivity rate was found between 0,4-2,1% [4,5].

Approximately 40% of patients with HCV infection have been reported to have at least one extrahepatic finding during the course of the disease [6]. These include hematological diseases such as cryoglobulinemia, lymphoma, various conditions where autoantibodies are elevated, renal diseases, and dermatological disorders such as lichen planus, porphyria cutanea tarda [7-10]. Both the direct cytopathic effect of the virus and indirect immunological mechanisms are accused of the emergence of extrahepatic manifestations [11]. Various publications suggest that there may be a relationship between HCV infection and thyroid function test disorders and autoimmune thyroid diseases [12-14]. Hypothyroidism and up to 25% of thyroid antibodies were detected in HCV infected patients, regardless of the degree of liver disease [12-15].

In this study, it was aimed to investigate the diagnosis of the thyroid gland in patients with HCV infection in Usak province, disorders of thyroid function tests, and the frequency of thyroid autoantibodies.

Material and Methods

Fifty-seven anti-HCV positive female patients who applied to Private Oztan Health Hospital between January 1, 2016 and December 31, 2018 were retrospectively evaluated and included in the study. The study was approved by Usak State Hospital Ethical Committee. Since there were only 4 male patients, female patients were included in the study. The laboratory results of the patients were obtained from the laboratory information system. Anti-HCV antibody was studied using the original reagent and calibrators on Vitros ECI/ECIQ Immunodiagnostic Systems, USA. Values above 1 mIU/mL were considered positive. Free T3, free T4, TSH, anti-TG and anti-TPO were measured with the chemiluminescent method with original reagents on Advia Centaur XP, Siemens USA. AST and ALT enzyme levels were studied with original reagents on Aeroset System, Abbott.

Statistical analyses were made with SPSS 11,5 package program. Free T3, free T4, TSH, anti-TG, anti-TPO, AST, and ALT results were compared statistically in both groups. The Student t-test was used to compare the mean of the laboratory test results between patient and control groups. The Pearson Chi-square test used for comparison of percentage rates. $P < 0,05$ was considered statistically significant.

Results

Table 1 shows age and laboratory tests results, mean \pm SD, and p-values in both groups with Student t-test. There was a significant difference in Anti-TPO, anti-HCV, and AST levels between the groups.

In our study, ft3 values of 6 patients were out of the reference range. In 3 patients (2 nontoxic multinodular goiters, 1 patient

Table 1. Age and laboratory tests results mean \pm SD and p-values of HCV (+) patients and control groups with Student t-test

	HCV (+) patients mean \pm SD	HCV (-) control mean \pm SD	p
Age	43,3 \pm 19,8	37,3 \pm 14,7	0,079
Free T3 (pg/mL)	3,23 \pm 0,63	3,23 \pm 0,42	0,955
Free T4 (ng/dL)	1,18 \pm 0,26	1,17 \pm 0,16	0,853
TSH (mIU/L)	6,43 \pm 22,42	2,06 \pm 1,60	0,156
Anti-TG (U/mL)	143,6 \pm 434,5	41,3 \pm 19,2	0,087
Anti-TPO (U/mL)	160,2 \pm 350,0	51,8 \pm 173,5	0,044*
Anti-HCV (mIU/mL)	5,68 \pm 7,1	0,09 \pm 0,09	0,000*
AST (U/mL)	24 \pm 17	16 \pm 5	0,002*
ALT (U/mL)	20 \pm 14	16 \pm 9	0,153

Table 2. Pearson Chi-Square test data and p values of HCV (+) patient and control groups

Parameters	Patient (n=57)	Control (n=57)	p-value
ft3	6	0	0,012
ft4	4	0	0,042
TSH	6	2	0,142
ATG	13	4	0,018
TPO	12	2	0,004
Thyroid Disease Diagnosis	10	1	0,004
Diagnosis and/or Dysfunction	16	2	0,000

not diagnosed with any thyroid gland disorder), the ft3 value was above the upper reference limit of 4,2pg/mL. In the remaining 3 patients (1 hypothyroidism, 1 nontoxic multinodular goiter, 1 not diagnosed with any thyroid gland disorder), the ft3 value was less than the lower reference limit of 2,3pg/mL.

The ft4 values of 4 patients were outside the reference range. In 2 patients (1 nontoxic multinodular goiter, 1 not diagnosed with any thyroid gland disorder), the ft4 value was above the upper reference limit of 1,76 ng/dL. In the remaining 2 patients (1 hypothyroidism, 1 nontoxic multinodular goiter), the ft4 value was less than the lower reference limit of 0,74 ng/dL.

The TSH value of 6 patients was outside the reference range. Of these patients, the TSH value of 3 patients, who were diagnosed with hypothyroidism, was above the upper reference limit of 5,5 mIU/L. One of the remaining 3 patients was nontoxic multinodular goiter, one was nontoxic goiter and the last one was not diagnosed with any disease related to thyroid gland, and TSH values were below the lower reference limit of 0,35 mIU/L.

The ATG antibody level of 13 patients was above the upper reference limit of 60 U/mL. Five (3 hypothyroidism, 1 nontoxic goiter, and 1 nontoxic multinodular goiter) of these 13 patients were diagnosed with thyroid gland disorders. The remaining 8 patients were not diagnosed with any thyroid gland disorder.

In 12 patients, the anti-TPO antibody level was above 60 U/mL, the upper reference limit. Five (3 hypothyroidism, 1 nontoxic goiter and 1 nontoxic multinodular goiter) of these 12 patients were diagnosed with thyroid gland disorders. The remaining 7 patients were not diagnosed with any thyroid gland disorder.

In 10 patients, both antibodies were above 60 U/mL, the upper

reference limit. While the anti-TPO antibody in 3 patients was within normal limits, only the anti-TG antibody was above 60 U/mL, while the anti-TG antibody was within normal limits in 2 patients, only the anti-TPO antibody was above the upper reference limit (60 U/mL).

Table 2 shows the number of cases in the patient and control groups, as well as the p-values found using the Pearson Chi-square test.

Discussion

In a study on 1047 chronic HCV patients treated with pegylated interferon and ribavirin in Poland, long-term thyroid dysfunction results were evaluated. TSH and FT4 baseline were measured every three months during treatment and 6,12 and 24 months after therapy. The patients were initially divided into two groups: with thyroid dysfunction (n=39, 3,7%) and without (n=77, 7,4%). Although the prevalence of thyroid dysfunction is lower than in most other available European literature, it has been observed that more than one-third of patients with thyroid dysfunction did not recover during treatment. They found that a quarter of patients with previous thyroid disorders recovered. As a result, treatment with pegylated interferon has been identified as an explanatory cause of potential thyroid dysfunction [16].

In a study conducted by Obolonczyk et al., 66 patients treated for HCV infection were evaluated for hormonal, immunological, ultrasonographic, and genetic parameters before and after interferon therapy. Tests revealed thyroid disorders in 24.2% of patients and autoantibodies without an imbalance in hormones in 43,9% of patients. In terms of interferon-induced thyroid disease, female sex, high TSH, presence of anti-TPO and increased blood flow rate in thyroid arteries were found to be risk factors [17]. In our study, patients who were retrospectively anti-HCV positive were screened from the laboratory information system for 2 years and only 4 male patients were found. Male patients were excluded from the study because the number of male patients was low. This finding supports that the female gender is a risk factor and coincides with the work of Obolonczyk et al.

In a study conducted by Cesur et al. in Ankara, 30 chronic HCV patients had an increase in FT3 and FT4 by 6,6%, a low TSH level as 3,3% and anti-TPO and anti-TG positivity as 6,6%. [18]. In our study, the FT3 value of a total of 6 patients was determined outside the reference range. FT3 disorders in these 6 patients were around 10,5% and higher than the Cesur's study. FT4 disorders in 4 patients were 7% and were higher than the Cesur's study.

As can be seen in Table 2, p-values found with the Pearson Chi-square test were statistically significant in parameters other than TSH. In terms of FT3 and FT4 values, this shows the presence of measurement results outside the reference range in the patient group more frequently than the control group. Additionally, anti-TPO and anti-TG antibody levels were found to be higher in the patient group more frequently than the control group. The frequency was higher in the patient group in terms of thyroid disease diagnosis and diagnosis and/or thyroid gland dysfunction parameters.

Female patients with HCV infection have a high risk of diseases related to the thyroid gland. The reason may be due to both

the HCV infection itself and the drugs used in the treatment. Therefore, these patients should be examined and monitored for thyroid gland disease, thyroid test dysfunction, thyroid autoantibodies. We think it is beneficial to carry out clinical research along with treatment follow-ups and also in the group of HCV infected male patients.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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